City of Tukwila Comprehensive Surface Water Management Plan

Prepared for

City of Tukwila

November 2003

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City of Tukwila Comprehensive Surface Water Management Plan

1. Introduction

1.1 Background

The purpose of the Comprehensive Surface Water Management Plan (Surface Water Plan) is to provide a strategic framework for the management of surface water within Tukwila. The Surface Water Plan is intended to be a flexible document that may be readily revised should the priorities and focus of the City change. It is also intended to act as a reference for other City departments whose activities may impact surface water and could be affected by drainage.

The role of surface water management in Tukwila is to:

1. Protect, conserve, and enhance watercourses, wetlands, infrastructure
2. Protect public safety, health and property
3. Maintain the City's surface water system
4. Meet federal, state, and local surface water regulatory requirements
5. Educate citizens and City employees

The City uses the following tools to manage surface water:

- Surface Water Management Policies
- The Comprehensive Land Use Plan (Land Use Plan)
- Comprehensive Surface Water Management Plan (Surface Water Plan)
- Capital Improvement Program (CIP)
- Citywide Operations and Maintenance (O&M) Program
- Public Works' Development Guidelines and Infrastructure Design Standards
- Development Review and Permit System

The City of Tukwila Comprehensive Land Use Plan (Land Use Plan) provides guiding policy for surface water management in the City. The Surface Water Plan gives the Public Works Department a guide to implement the policy set in the Comprehensive Plan and is intended to assist the City to meet its surface-water-related legislated responsibilities as well as recommend improvements to operations and maintenance activities and the CIP. The Capital Improvement Program (CIP) is developed to set funding for projects and program elements that are recommended in the Surface Water Plan. The CIP is often developed concurrently with Comprehensive Plan development. The Operations and Maintenance (O&M) program gives the Public Works Department a guide for operating and maintaining the existing surface water infrastructure in the City. Public outreach and the development review process provide valuable opportunities to work proactively with citizens and

developers to introduce new concepts of surface water management and promote an understanding of surface water issues and their impact on the City.

This document is the first update since the first Surface Water Plan was prepared in 1993. It addresses changes that have taken place since 1993, including new federal regulations and changing surface water management techniques and strategies. The City has implemented many of the recommendations contained in the initial Surface Water Plan and has addressed its most pressing basic issues related to property damage from flooding. As the City moves through its hierarchy of needs, it is expected that the focus will shift from addressing these basic quantifiable needs to goals that relate more to the character of the City and the vision of its citizens and leaders.

1.2 Objective

The objective of the Surface Water Plan is to provide a surface water management framework that will protect the public's safety, health and property, conserve and enhance natural systems within the City, and comply with local, state, and federal regulations. This update was developed using the following principles:

- The Surface Water Plan should be a "living" document that encompasses alternative solutions such as Low Impact Development and can be adapted to conditions and priorities.
- The recommendations should meet the current and anticipated requirements of federal regulations, particularly the Endangered Species Act (ESA) and Phase II of the National Pollution Discharge Elimination System (NPDES).

1.3 Report Organization

The body of this plan summarizes the general surface water conditions in the City. Technical conclusions are detailed in appendices. The Plan comprises the following:

- **Section 1**: Introduction to the City of Tukwila Comprehensive Surface Water Management Plan
- **Section 2**: Summary of the physical surface water, drainage, and drainage-related characteristics of the City
- **Section 3**: Review of the regulatory framework to assure the City's surface water management policies are in compliance with federal, state, and local regulations (also discussed in Appendix B)
- **Section 4**: Documentation of surface water management issues in the City (also discussed in Appendix B)
- **Section 5**: Identification of projects that address surface water management issues; these projects will be part of the City's CIP (also discussed in Appendix C). Summary of how Low Impact Development / Natural Drainage techniques can address surface water management issues (also discussed in Appendix D).

- **Section 6**: Documentation of the existing O&M programs and recommendations to increase the efficiency and effectiveness of that program. Guidance for all City operations to meet federal regulations regarding water quality and the protection of natural surface water resources (also discussed in Appendix E)

2. Drainage Basin Characteristics

Topography, land use, climate, soils, and other physical characteristics affect surface water runoff quantity and quality in the City. An overview of these physical characteristics is presented in this section so that the causes of surface water problems can be better understood.

2.1 General Description

The City of Tukwila is located where the Black and Green Rivers converge and become the Duwamish River, and encompasses over 5,500 acres (see Figure 1). The climate is typical of areas west of the Cascade Mountains and is strongly influenced by the Pacific Ocean. Winters are generally wet and mild with temperatures varying from 30°F to 50°F. Summers are usually relatively dry and cool with temperatures rarely exceeding 80°F. The average annual precipitation is between 32 and 38 inches.

The Green and Duwamish Rivers dominate the geography and drainage of Tukwila. The topography comprises a relatively flat and poorly drained floodplain adjacent to the rivers and steeply sided valley walls to the west. Soils in the valley floor belong to the Newberg and Woodinville Series: a very fine sandy loam and a silty clay loam, respectively. The valley walls typically comprise soils from the Alderwood Series (interbedded silts and clays) and are characterized by numerous hillside springs and the accompanying potential for instability.

2.2 Drainage Basins

Consistent with the initial Water Management Plan, the City has been divided into seven drainage basins (see Figure 2). Portions of basins listed in Table 1 are located outside City limits as shown in the table.

TABLE 1
Drainage Basin Areas

Basin Name	Total Basin Area (acres)[1]	Area of Basin in City (acres)	% of Basin in City
Duwamish-Green	3,800	2,200	58
Gilliam	1,800	1,300	72
Nelson	140	140	100
P17	1,300	790	61
Riverton	450	390	87
SE Central Business District (CBD)	120	120	100
Southgate	550	480	87
Total	8,200	5,400	66

[1]Basin areas are approximate. See Appendix C for a description of the drainage basin delineation done for this project.

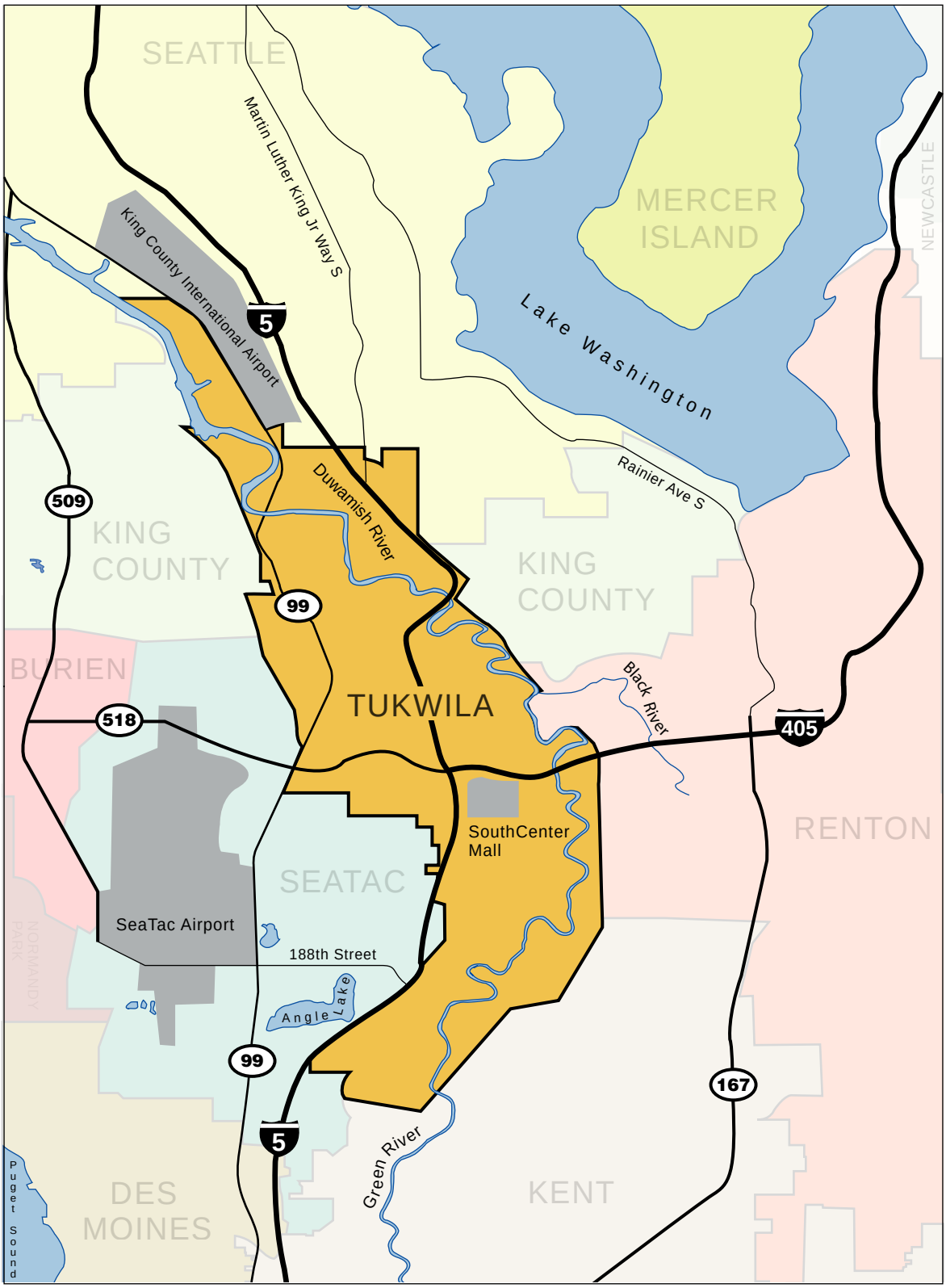
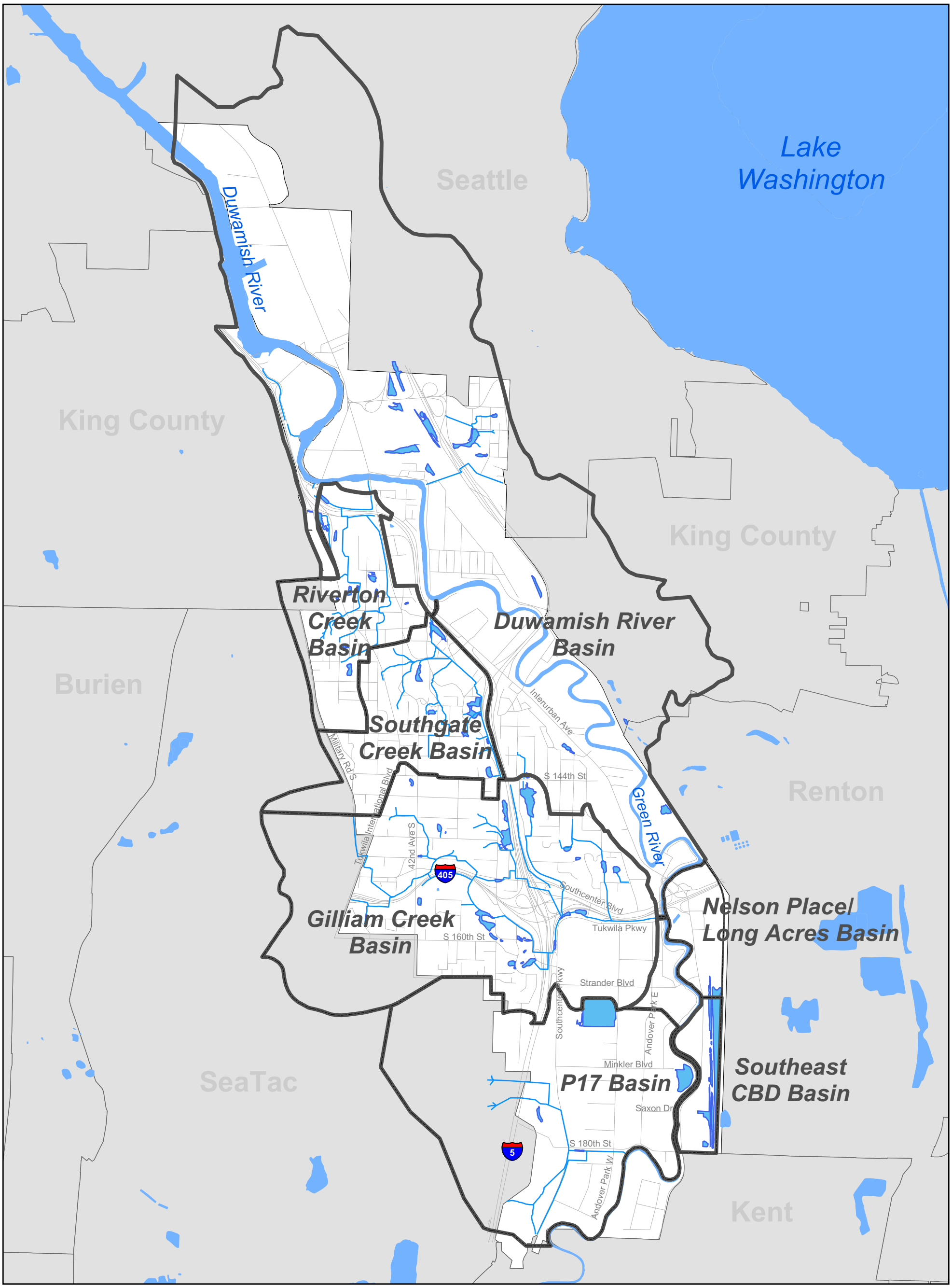


Figure 1
City of Tukwila Vicinity Map
City of Tukwila Comprehensive
Surface Water Management Plan



Legend

- Roads
- Streams
- Water Body/Wetland
- Basin Boundary
- Neighboring (Jurisdicitions)
- Study Area

N

0 0.5 1 Miles

Data shown in this map are in Washington State Plane North, NAD 1983

Figure 2

Drainage Basins

City of Tukwila Comprehensive Surface Water Management Plan

Detailed information for each basin can be found in Appendix C.

2.3 Land Use

The City of Tukwila has a population of approximately 17,000, and the land is fully developed. Land use within the City varies from undeveloped natural land to highly developed industrial areas. The City can be divided into three primary zones:

- Manufacturing / industrial center to the north
- Commercial area (including Southcenter) in central and south Tukwila
- Residential development to the west and to the north

Table 2 lists the areas for the different development land use zones and open areas for each basin within the City.

Much of the undeveloped land comprises sensitive areas and locations that are difficult to build on such as steep slopes.

TABLE 2
Tukwila Land Use Zoning and Open Areas

Basin Name	Residential		Commercial		Industrial		Existing and Planned Parks		Undeveloped Land	
	Acres[1]	% of Basin[2]	Acres[1]	% of Basin[2]	Acres[1]	% of Basin[2]	Acres[1]	% of Basin[2]	Acres[1]	% of Basin[2]
Duwamish-Green	686	31	127	6	1092	50	116	5	93	4
Gilliam	731	56	332	25	0	0	37	3	45	3
Nelson Place	0	0	100	71	15	11	0	0	27	19
P17	71	9	559	71	96	12	18	2	75	9
Riverton	202	52	20	5	166	43	0	0	46	12
SE CBD	0	0	1	1	114	95	0	0	14	11
Southgate	355	74	63	13	45	9	18	4	24	5

[1]Basin areas are approximate. See Appendix C for a description of the drainage basin delineation done for this project.

[2]Note that percentages are based on area of the basin within the City of Tukwila.

2.4 Future Development

Apart from some minor boundary adjustments and annexations, the overall footprint of Tukwila is not expected to increase significantly. Surface water management issues related to the annexation areas are discussed in Appendix A. Similarly, the population is not expected to grow significantly, and then only as a result of redevelopment that may increase residential densities.

Future development and re-development should be undertaken in accordance with the City's surface water manual (1998 King County Surface Water Design Manual at the time of this memorandum). The City has also identified areas where infiltration is not allowed and Level 2 storm water detention is recommended (shown in Figures 3 and 4, respectively).

LEGEND

Areas where infiltration not allowed

0 4,000 Feet

Figure 3

Areas Where Infiltration is not Allowed

City of Tukwila Comprehensive

Surface Water Management Plan

LEGEND

Areas where Level 2 Storm Water detention recommended

0 4,000 Feet

Figure 4

Areas Where Level 2 Storm Water Detention Recommended

City of Tukwila Comprehensive Surface Water Management Plan

Infiltration is not allowed in landslide hazard areas. Level 2 detention is recommended in order to protect downstream drainage courses from high peak flows and erosion.

One major proposed redevelopment initiative is the Tukwila Urban Center (TUC). The TUC covers the area known as Southcenter. The TUC is bounded by I-5 to the west, I-405 to the north, the City limits to the east, and South 180th Street to the south. The TUC also includes the station at Longacres that serves Amtrak and the Sounder commuter rail. The City is currently preparing a strategic plan to guide the continuing growth and redevelopment of the TUC over the next 20 years, focusing on a transition from the current pattern of sub-urban development to an urban environment. The plan will foster the type of high-density, pedestrian-oriented development served by high-capacity transit. The plan will also coordinate the City's response to a number of significant transportation and land use pressures that provide both risks and opportunities for the long-term well being of the TUC.

3. Surface Water Issues

This section summarizes existing river management practices and land uses affecting flooding, water quality, and aquatic habitat in Tukwila's surface waters, and describes existing surface water problems.

3.1 Available Data

The following sources of information were used to identify drainage and habitat-related issues and problems:

1. Anecdotal and recorded information provided by City staff
2. Observations made during inspections by CH2M HILL, Herrera, and City staff
3. 1993 City of Tukwila Surface Water Management Comprehensive Plan
4. The following drainage studies:
    - 1993 Surface Water Management Comprehensive Plan
    - 1994 Gilliam Creek Detention and Water Quality Enhancements
    - 1996 Fostoria Basin Stormwater Quality Management Plan
    - 1997 Southgate Creek By-Pass Study
    - 1997 Riverton Creek Stormwater Quality Management Plan
    - 2001 Gilliam Creek Basin Storm Water Management Plan

Problems may be resolved through the use of regulations, construction of CIPs, and/or implementation of O&M measures.

3.2 General Description

The following types of surface water management issues are identified in this plan:

- Flooding
- Fish habitat
- Water quality

Localized flooding problems are the primary concern in the City. Right-of-way (ROW) and private flooding problems arise because there are no storm drainage systems, the existing conveyance systems are damaged or in need of maintenance, or the existing conveyance systems have inadequate hydraulic capacity. Flooding from the Green and Duwamish Rivers is not considered to be a significant concern because of the regulating effects of the Howard Hanson Dam, which was constructed in 1962. Levees built in conjunction with the Howard Hanson Dam construction also help contain flood levels in both rivers. Lower reaches of creeks have the potential to flood when high creek flows coincide with high water levels in the rivers. In 1985, the City entered into the "Green River Management Agreement" with King County and other neighboring communities. This agreement includes a number of guidelines to control impacts to the Green River.

Available habitat for fish and other aquatic organisms has been significantly reduced in the creeks that drain Tukwila due to the effects of urban development and loss of riparian buffer areas. Uncontrolled runoff flows coupled with steep slopes in the upper reaches of Gilliam, Southgate, and Riverton Creeks cause channel erosion that in turn delivers sediments to the lower-gradient downstream reaches of these streams. Sediment deposition significantly reduces the conveyance capacity of several culverts, restricts fish passage, and hinders the potential for salmonid spawning in the lower reaches. Several long culverts with steep gradients and high vertical drops in all three of these creeks limit accessibility for fish to much of the stream network. In addition, the lower reaches of these creeks are generally lacking in pools and woody debris, which is typically a pool-forming feature of healthy stream systems. If there were better quality habitat in the lower reaches of these streams, they would provide great value to salmonids seeking refuge at many times of the year from high flows and predators in the Green/Duwamish River.

Water quality problems are evident in all of the surface water bodies receiving runoff from developed areas in Tukwila. Untreated runoff from arterial streets with intensive traffic usage, areas of dense commercial development, parking lots in the Tukwila International Boulevard corridor and Westfield Mall area, and Interstates 5 and 405 contributes greatly to these problems. Gilliam Creek exhibits elevated turbidity in storm events, consistently high levels of fecal coliform bacteria, and also high levels of copper and zinc that occasionally exceed state standards. Riverton Creek exhibits high levels of fecal coliform bacteria, phosphorus, turbidity, total suspended solids, and copper, among other pollutants. Southgate Creek also exhibits high levels of fecal coliform bacteria and excessive turbidity and sediment loading related to channel erosion. The reach of the Green River in the vicinity of Tukwila is on the state's Section 303(d) list of threatened and impaired water bodies for fecal coliform bacteria, mercury, and temperature. Runoff conveyed to the river via Tukwila's streams is contributing to downstream water quality degradation.

3.3 Identified Problems

Table 3 presents a summary of the number of identified flooding, fish habitat, and water quality problems. The surface water issues and the surface water issue identification process are discussed in detail in Appendix C.

TABLE 3
Surface Water Problem Summary

	Number of Problems		
	Flooding	**Fish Habitat**	**Water Quality**
Duwamish-Green River Mainstem	5	1	2
Gilliam Creek	7	3	1
Nelson Place-Longacres	1	1	0
P17	1	0	1
Riverton Creek	3	2	1
SE CBD	0	0	0
Southgate Creek	7	2	2
Totals	24	9	7

4. Regulations and Policies

4.1 Existing Regulatory Compliance

Significant regulatory changes have occurred since the City approved the 1993 Surface Water Plan. These regulatory changes affect surface water management, water quality, flood protection, and habitat protection. Tukwila's surface water management program was evaluated with respect to all applicable regulations, and anticipated revisions to those regulations, to identify program improvements that need to be implemented to achieve compliance. Appendix B provides a detailed discussion of applicable regulations and the status of the City's efforts to meet the regulatory requirements.

Recommended actions to improve upon regulatory compliance are presented in Section 7 of this report. In general, the City's surface water management activities support its regulatory compliance requirements and obligations, but there are some additional steps that must be taken to ensure regulatory compliance and to better coordinate environmental compliance activities across various City departments.

4.2 Potential Regulatory Changes

A number of changes in regulations relevant to surface water management are expected to occur in the next five years. In general, these changes will increase the City's obligations to protect water quality and fish habitat, increase monitoring requirements, and implement greater integration and coordination among programs aimed at improving environmental protection. Tukwila will need to accommodate such changes in its surface water management planning and program implementation. These changes relate to the City's NPDES Phase II municipal stormwater permit, the Washington State Department of Ecology's Total Maximum Daily Load (TMDL) program and its strengthened anti-degradation policy for protection of surface water quality, and the possibility that additional salmonid species will be listed under the Endangered Species Act. Appendix B provides

more detailed discussion of regulatory issues that the City of Tukwila faces in its surface water management efforts in the coming years.

4.2.1 NPDES Phase II

Changes in the City's surface water management program are required to comply with the anticipated requirements imposed by the Department of Ecology (Ecology) in its Phase II NPDES municipal stormwater permit. The City has applied for coverage under Ecology's NPDES Phase II permit program, but specific compliance measures that will be necessary in the coming years are yet to be determined by Ecology. To date, it is only clear that the City will need to abide by a minimum of six basic compliance measures. Those measures include:

- Public education and outreach
- Public participation and involvement
- Detection and elimination of illicit discharges
- Control of construction site runoff
- Control of post construction runoff
- Pollution prevention/good housekeeping

The recommended actions listed in Section 7 of this report will help to ensure compliance with the City's eventual NPDES Phase II permit conditions.

The Green/Duwamish River, Gilliam Creek, Southgate Creek, and Riverton Creek already exceed state water quality standards in terms of at least one parameter, and the more stringent water quality standards proposed by Ecology will likely result in more frequent exceedances. The City does not currently conduct water quality monitoring using methods specified by Ecology; therefore, the updated surface water quality standards (which would likely be tied directly to the City's new Phase II municipal NPDES permit) might trigger a need for more extensive water quality monitoring.

4.2.2 Department of Ecology TMDL Program and Anti-Degradation Policy

Ecology will be undertaking TMDL studies in the Green/Duwamish watershed in the coming years to determine necessary limits of pollutant loadings to protect water quality. Pollutant loadings emanating from Tukwila will undoubtedly be included in these studies and in the ensuing action plans. The City will then be required to implement pollutant reduction measures in an effort to support TMDL achievement. The main "pollutants" of concern for Tukwila are likely to be fecal coliform bacteria and temperature.

Ecology is also revising its anti-degradation policy. This may have the most significant effect on the City's water quality protection efforts. The proposed policy changes will apply to all actions that undergo compliance review by Ecology (which include any projects that trigger a SEPA review). In addition, the proposed changes require that all present or future actions that are likely to cause or contribute to the lowering of water quality must use all known, available, and reasonable methods of prevention, control, and treatment to reduce impacts on water quality.

This anti-degradation policy may effectively require application of pre- and/or post-construction surface water BMPs on more projects than would otherwise be required. Over the next few years, the City should carefully assess how this policy translates into regulations. In a worst-case scenario, Ecology could require retrofitting of surface water

treatment facilities into existing drainage systems in relation to this policy. The City should be cognizant of the pending need for additional surface water BMPs on a wide variety of projects, and incorporate them accordingly into planning for future City projects and into requirements imposed on private developments.

4.2.3 Potential Endangered Species Act Listing of Coho Salmon

The potential Endangered Species Act (ESA) listing of coho salmon species may designate lowland areas used for rearing, foraging, and migration within the City's jurisdiction as critical habitat. That would likely require changes in City policies and programs including road maintenance practices, stormwater treatment, maintenance of storm drainage facilities, monitoring of water quality and flow, and watershed programs.

5. Storm Drainage CIP Projects

5.1 Projects

Projects were developed to address identified problems listed in Section 4 together with detailed scopes and planning level cost estimates. The projects were prioritized and ranked in order of a "cost-to-benefit point" ratio. Appendix C includes a detailed discussion of project development and ranking.

To address flooding problems in the City, conveyance system retrofits and new conveyance systems were recommended. One regional detention pond was recommended for the Gilliam Creek basin. Previous studies identified potential regional detention pond projects for the Riverton and Southgate Creek basins. However, these projects were not recommended by this report because the Tukwila International Boulevard bypass pipeline will address many of the flooding and erosion concerns in these two basins.

Several projects for stream habitat improvement and fish passage barrier removal are recommended to address deficiencies in habitat quality, to improve accessibility to additional stream reaches for fish, and to restore habitat conditions in areas where it is cost-effective to do so. Several of these projects are recommended in the Southgate Creek basin, and a few more are recommended in the Riverton Creek and Gilliam Creek basins. Several projects are also recommended along the mainstem of the Green/Duwamish River where riparian conditions are degraded. Many of the habitat projects are linked to watershed restoration efforts by the U.S. Army Corps of Engineers and other agencies, and therefore the City will need to coordinate their implementation with other agencies.

Only one project is recommended to address water quality problems. This project entails installation of surface water treatment facilities for the Tukwila International Boulevard bypass. The recommended streambank stabilization projects and other habitat improvement projects should also provide water quality benefits. Almost all of the other water quality projects that were evaluated are not recommended at this time because of low benefits relative to the cost. It is very difficult to achieve significant water quality improvements with retrofitting of surface water treatment facilities in a built-out area with diffuse sources of runoff pollution as is the case in most of Tukwila. The City will likely realize greater water quality benefits through other non-project means, such as educational programs, improved construction site erosion and sediment control practices, improved surface water

treatment facilities for development sites, and application of effective BMPs to operations and maintenance activities.

Figure 5 shows the location of the prioritized projects. Table 4 summarizes the ranking of CIP projects that solve flooding and water quality problems in the City. Table 5 summarizes the ranking of CIP projects that improve fish habitat.

Several projects included in Tables 4 and 5 are highlighted because they are not recommended for construction at the present time for one or more of the following reasons:

- The City does not consider the project a high-priority project given its location or the extent of a problem it would address.
- The benefits would be marginal if other recommended nearby CIP projects are constructed.
- The project requires more analysis.

When developing its annual CIP, the City will need to consider additional factors, including the availability of funds.

5.2 Alternative Approaches

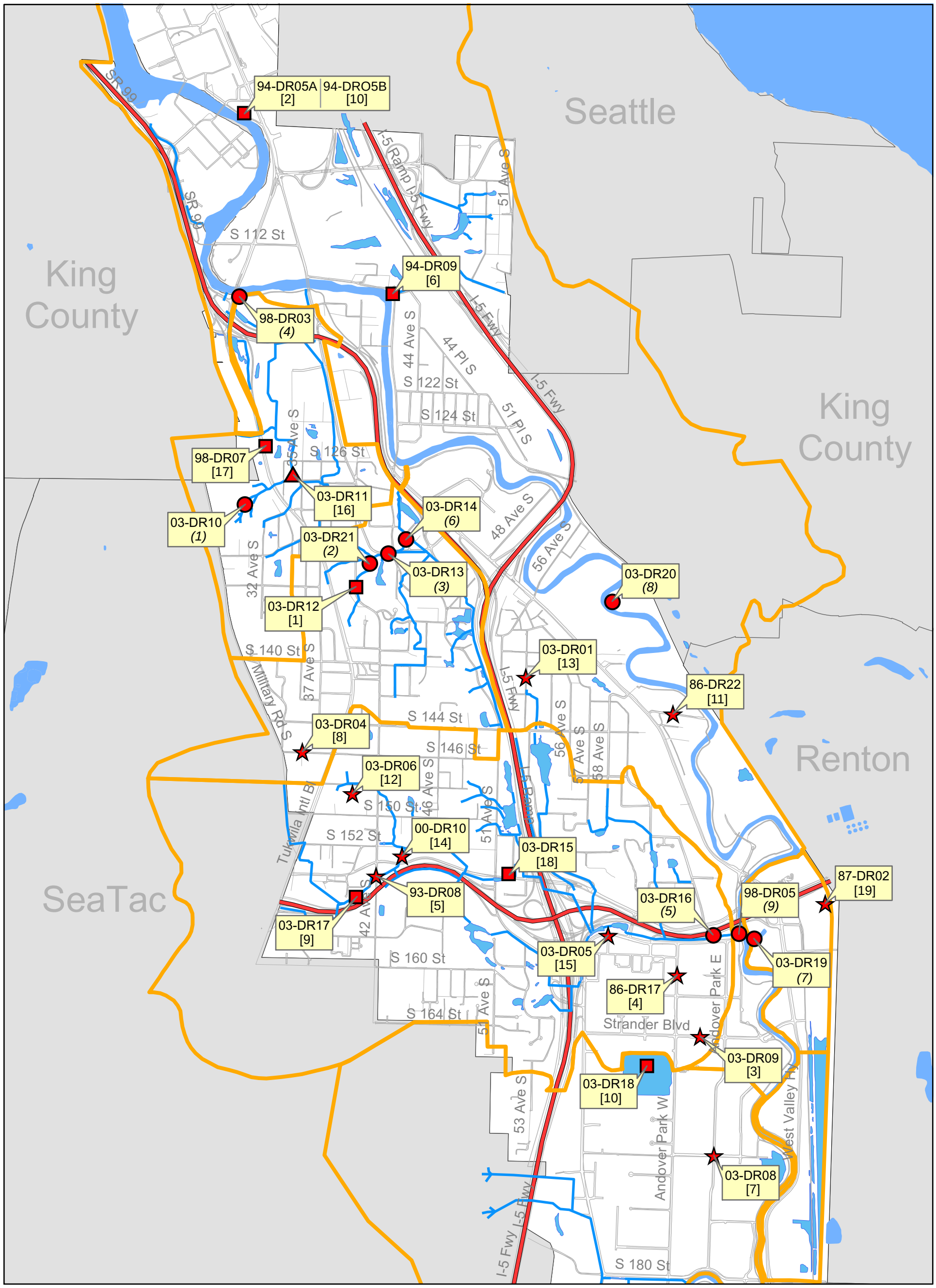
The projects listed above may be considered "traditional" approaches to solving urban surface water issues. These approaches can result in solutions such as new and/or oversized pipes at flooding locations, which are usually constructed as CIP projects. Another alternative that can address surface water issues is low impact development. Low impact development, discussed in detail in Appendix D, is a different approach than conventional systems that convey runoff to large facilities where runoff is detained and pollutants are removed.

5.2.1 General Description

Low impact development is a surface water management technique that attempts to mimic natural hydrology by using techniques that infiltrate, filter, store, evaporate, and detain runoff as close to its original source as possible. Low impact development techniques include:

- Bioretention
- Permeable pavements
- Open swales
- Vegetated (green) rooftops

Compared to more traditional approaches, low impact development techniques are less expensive to install, and have lower O&M costs. Environmental benefits include enhanced aquatic habitats and water quality. Recent studies show that low impact approaches can infiltrate and treat between 95 to 100 percent of the annual volume of rainfall and that they are less expensive than traditional detention/retention and treatment techniques.



Legend

Stormwater CIPs

- Water Quality
- Flooding
- Habitat
- Water Quality/Habitat

[21] Flooding/Water Quality Project Rank - 412 Fund

(7) Habitat Only CIP Project Rank - 301 Fund

N

0 0.5 1 Miles

Figure 5

Prioritized Capital Improvement Projects

City of Tukwila Comprehensive Surface Water Management Plan

Data shown in this map are in Washington State Plane North, NAD 1983

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TABLE 4
Prioritized Flooding and Water Quality CIP Projects – 412 Fund

Rank	Cost Benefit Points	Project ID	Basin	Project Title	Benefit Points	Project Cost
1	$637.50	03-DR12	Southgate	Southgate Creek Streambank Stabilization	80	$51,000
2	$1,057.14	94-DR05A	Duwamish	Duwamish Riverbank Stabilization I(a)	70	$74,000
3	$1,627.91	03-DR09	Gilliam	Gilliam Creek/Christensen Road Storm Drain System Connection	172	$280,000
4	$2,610.47	86-DR17	Gilliam	Andover Park W 48-inch Drain Rehabilitation	172	$449,000
5	$2,642.86	93-DR08	Gilliam	Gilliam Creek 42 Ave S Culvert	112	$296,000
6	$2,850.00	94-DR09	Duwamish	Duwamish Riverbank Stabilization II	100	$285,000
7	$4,722.22	03-DR08	P-17	Minkler Boulevard Culvert Replacement	90	$425,000
8	$6,875.00	03-DR04	Southgate	S. 146th Street Pipe and 35th Avenue S Drainage System	80	$550,000
9	$7,828.57	03-DR17	Gilliam	Treatment Pond for Gilliam Creek Northwest Tributary	35	$274,000
10	$8,500.00	94-DR05B	Duwamish	Duwamish Riverbank Stabilization I(b)	70	$595,000
11	$9,462.50	86-DR22	Duwamish	S 143 Street Storm Drain System	80	$757,000
12	$10,630.77	03-DR06	Gilliam	Northwest Gilliam Storm Drainage System	130	$1,382,000
13	$12,000.00	03-DR01	Duwamish	53rd Avenue S. Storm Drain System	80	$960,000
14	$14,625.00	00-DR10	Gilliam	Gilliam Creek Regional Detention Pond	112	$1,638,000
15	$16,571.43	03-DR05	Gilliam	Tukwila Parkway Drainage from Westfield Mall to Gilliam Creek	14	$232,000
16	$21,250.00	03-DR11	Riverton	Property Acquisition for Riverton Creek Sediment Trap	20	$425,000
17	$27,181.82	98-DR07	Riverton	Treatment Facilities for Tukwila International Boulevard Bypass.	22	$598,000
18	$50,450.00	03-DR15	Gilliam	Retrofit Stormwater Treatment and/or Detention Pond for Runoff from 51st Ave S.	20	$1,009,000
19	$90,666.67	87-DR02	Nelson Place/Longacres	Nelson Pl/Longacres Interceptor Pipe	6	$544,000

NOTE: Highlighted rows indicate inactive projects.

TABLE 5
Ranking Summary for Fish Habitat CIP Projects – 301 Fund

Rank	Cost Benefit Points	Project ID	Basin	Project Title	Benefit Points	Project Cost
1	$1,296.05	03-DR10	Riverton	Riverton Creek Upper Watershed	152	$197,000
2	$1,643.94	03-DR21	Southgate	Southgate Creek Habitat Restoration	132	$217,000
3	$2,200.00	03-DR13	Southgate	Southgate Creek Daylighting at S. 133rd Street	115	$253,000
4	$2,325.58	98-DR03	Riverton	Riverton Side Channel	129	$300,000
5	$2,583.33	03-DR16	Gilliam	Lower Gilliam Creek Channel Improvements	96	$248,000
6	$2,928.57	03-DR14	Southgate	Southgate Creek Salmon Habitat Restoration Downstream of S. 133rd St.	98	$287,000
7	$4,243.42	03-DR19	Nelson Place/Long acres	Nelson Salmon Habitat Side Channel	152	$645,000
8	$5,166.67	03-DR20	Duwamish	Golf Course Riverbank	84	$434,000
9	$13,500.00	98-DR05	Gilliam	Gilliam Creek Fish Barrier Removal	50	$675,000
10	$127,937.50	03-DR18	P-17	Tukwila Pond Improvements	16	$2,047,000

NOTE: Highlighted rows indicate inactive projects.

5.2.2 Implementation

The success of low impact development is dependent on a number of factors, as follows:

- Soil permeability
- Water table depth
- Land slope
- Community perception

Publicly funded projects offer opportunities to demonstrate the feasibility of alternative approaches. Other opportunities arise when new areas are developed and existing areas are re-developed. Changes to the traditional approaches include reducing street widths, providing shared driveways, and replacing curbs and gutters with drainage swales or landscaped areas. Incentives may be necessary until the practices are demonstrated locally.

Possible opportunities for low impact development include:

- Tukwila Village
- Tukwila Urban Center
- Tukwila Manufacturing/Industrial Center
- Residential areas west of I-5
- CIP 8G-DR22: S. 143rd Street/Place Storm Drain System

- CIP 03-DR01: S. 53rd Street Storm Drain System
- CIP 03-DR04: S. 146th Street Pipe and 35th Avenue S. Drainage System
- CIP 03-DR06: Northwest Gilliam Storm Drainage System
- Public, private, and public/private redevelopment projects such as the Tukwila Urban Center
- Residential areas where local, low-traffic streets need to be rebuilt or have significant subsurface utility installation or replacement, such as the areas between I-5 and International Boulevard

Successfully implementing alternative approaches will require regulatory changes. Subdivision codes, zoning regulations, development guidelines, construction standards, and local ordinances might encourage the adoption of such practices. These rules are responsible for wide streets, expansive parking lots, and large-lot subdivisions that reduce open space and natural features. The goals and policies provided in the Land Use Plan should be evaluated to ensure that they are consistent with and provide the flexibility needed to implement alternative approaches.

Sufficient information is not available to assess whether and where to implement low impact development in Tukwila. To assist the decision-making process, the City should perform a study to gain a better understanding of potential low impact development applications and the impacts of implementing low impact development in the City. At a minimum, the study should include the following:

1. Review of the current and future Department of Public Works Capital Improvement Program (CIP) projects to identify opportunities to implement low impact development techniques.
2. Review of the comprehensive land use plan, zoning, drainage, building codes, and street standards. Identify barriers to low impact development practices and recommend changes to encourage these practices.
3. Education on low impact development for staff and developers.
4. Recommendations for new regulations and incentives for low impact development implementation.

6. Operations and Maintenance

The operation and maintenance of existing surface water facilities is an important part of the City's surface water management program. The O&M Department has a division dedicated to surface water issues. The other divisions of the O&M Department (sewer, street, and water) and City facilities (for example, pools, community centers, and fire departments) are not focused directly on surface water management; however, these divisions and facilities also affect surface water and must meet requirements of various surface water regulations. A detailed discussion of O&M practices of concern for potential water quality impacts is included in Appendix E.

6.1 Surface Water O&M

Surface water O&M staff perform the following:

- Respond to citizen complaints regarding surface water problems
- Observe and document new and existing surface water issues
- Maintain and operate surface water facilities

In general, the O&M Program has well-established guidelines for its various activities. These guidelines are based on previous experience and are optimized for the available maintenance crew resources.

Additional documentation is recommended for the surface water O&M Program in all areas, which include: existing drainage system mapping, complaint/complaint response, and location of surface water "hot spots." This institutional knowledge, much of which will be lost as experienced staff leave the department, is essential for the City to:

- Understand the causes of surface water problems in the City
- Adjust maintenance activities to address evolving O&M needs
- Make staffing recommendations that may be required to address changes in maintenance activities

It is also recommended that the City develop a vactor decant policy and locate and secure a permanent site to decant solids from vactor and street sweepings.

6.2 Regulatory Compliance

The City, businesses, and residents are involved in activities that could potentially affect surface water. Water quality impacts from these activities can be offset by best management practices (BMPs). Many of these BMPs are recommended and/or required by these surface water regulations:

- Clean Water Act
- Coastal Zone Management Act
- National Pollutant Discharge Elimination System (NPDES) Phase II Permit
- Puget Sound Action Team's Water Quality Management Plan

Many water quality BMPs are currently being implemented by the City in its O&M work; however, gaps still exist between City operations and regulatory recommendations and requirements.

Under its pending NPDES municipal stormwater permit, the City will be required to show progress in eliminating all non-stormwater discharges to surface water systems. The objective is that only uncontaminated stormwater may be discharged to the City's surface water drainage systems.

Ecology is obligated under the ESA to issue a permit that does not adversely affect federal-listed endangered and threatened species and critical habitat. That requirement necessitates that none of Tukwila's stormwater discharges, allowable non-stormwater discharges, or discharge-related activities will likely impact federal threatened or endangered species.

Recommended changes to the City's operations and maintenance practices to achieve regulatory compliance are presented in Section 7 of this plan.

7. Recommendations

Table 6 summarizes the recommendations made in this plan.

TABLE 6
Comprehensive Surface Water Management Plan Recommendation Summary

Regulations and Policies
Required
Formally adopt the 1998 King County Surface Water Design Manual. Subsequently review pending updates to the King County Surface Water Design Manual, as well as other manuals that are deemed equivalent to the Washington Department of Ecology's Stormwater Management Manual for Western Washington, and adopt a newer stormwater manual by December 2004, with specific provisions for the City of Tukwila as appropriate.
Formalize a program for detecting and eliminating illicit (non-stormwater) discharges to surface water systems.
Enforce erosion and sediment controls at construction sites.
Update the flood ordinance as needed to meet Growth Management Act requirements and formally adopt it by December 2004.
Recommended
Implement a pollution identification and source control program in areas identified as contributing to pollutant loads.
Improve public education and awareness about pollution prevention.
Investigate the Puget Sound Action Team as a funding source and technical information source for program actions Tukwila would like to implement to meet NPDES permit requirements.
Update the SEPA Endangered Species Act screening checklist to include Coastal-Puget Sound bull trout.
Use the SEPA Endangered Species Act screening checklist for City O&M activities and facilities management.
Maintain a close watch on the status of coho salmon and coastal cutthroat trout populations in the Puget Sound area and prepare for changes in surface water management efforts should the status further decline. If coho salmon and/or coastal cutthroat trout are listed under the Endangered Species Act (ESA), review and update the City's surface water practices to ensure compliance with the ESA.
Closely track NPDES permit requirements as soon as they are issued and keep track of TMDL activities in the watershed to enable timely assessment of any water quality monitoring needs.

TABLE 6

Comprehensive Surface Water Management Plan Recommendation Summary

Surface Water Management Issues
Recommended
Incorporate the prioritized projects listed in Section 4 into the City's 6-year CIP
Take active steps to reduce pollution problems in city streams, with particular emphasis on fecal coliform bacteria, to reduce the severity of forthcoming state-imposed TMDL requirements.
Perform targeted water quality monitoring in Gilliam, Southgate, and Riverton creeks and in other drainages with outfalls to the Green River or Duwamish River to confirm pollutants of concern (or lack thereof) in relation to Section 303(d) listings for the Green and Duwamish rivers, identify pollutant sources, and provide a basis for developing TMDLs if required to do so by Ecology.
Increase implementation of capital improvement projects for water quality and habitat improvements. Actively seek additional funding sources for these projects to expedite them.
Low Impact Development
Recommended
Perform a study to gain a better understanding of potential low impact development applications and the impacts of implementing LID in the City.
Operations and Maintenance
Recommended
Develop additional documentation for all aspects of the City's O&M program (e.g. existing drainage system mapping, surface water course mapping, complaint/complaint response, and location of surface water "hot spots."
Develop a vactor decant policy and locate and secure a permanent site to decant solids from vactor and street sweepings. Until a permanent site is available for processing of vactor truck solids and decant water, the City should make it a priority to evaluate handling of vactor decant water at its existing maintenance yards and to implement additional water quality protection BMPs as necessary.
Review and improve stormwater pollution control measures for City operations and maintenance work. Appendix E provides a basis for this.
Designate a department/working group as the leaders responsible for effective source control BMP implementation at City-owned facilities and by City crews. That group should further investigate the City's O&M practices through interviews of department staff and site visits to facility locations.
Review emergency spill response and containment procedures within each facility or department.
Provide employee educational and training programs to address pollution prevention BMPs, safety, and spill response procedures.
Perform regular inspections for all facilities storing liquids, chemicals, or solid waste.
Perform site-specific evaluations to assess how stormwater runoff is handled at sites where refueling, vehicle maintenance, equipment repair, chemical applications, building or construction activities, and/or vehicle or equipment washing occurs. Drainage patterns should also be assessed at locations where permanent or mobile storage containers are kept.
Develop pest management plans for O&M crews, the Parks Department, Foster Links Golf Course, and any other City operations that apply herbicides.